

Aug. 13, 1940.

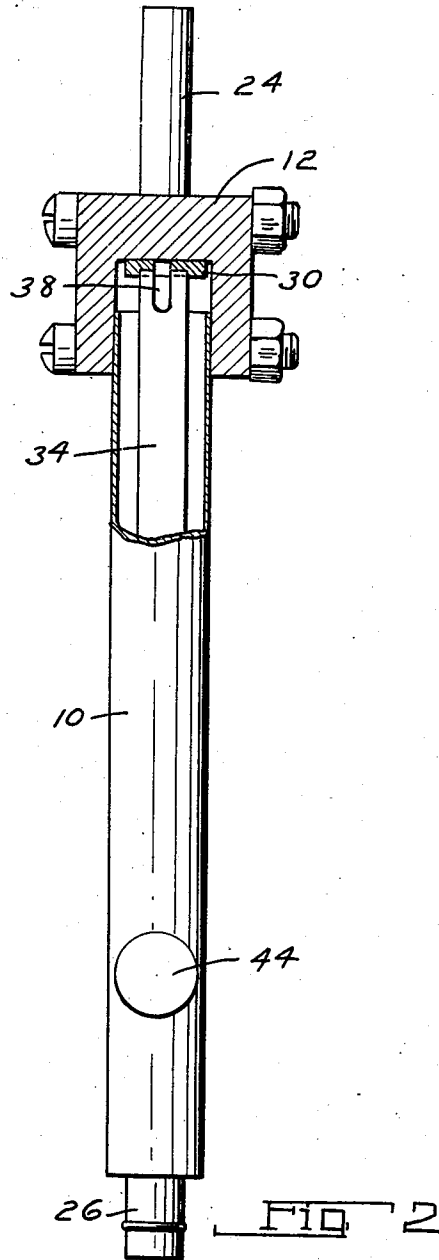
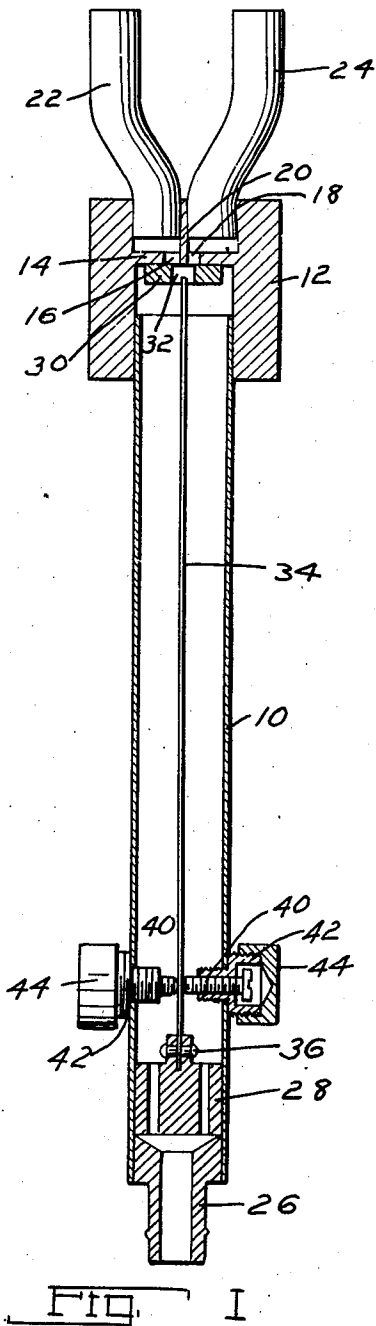
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2,211,481

MIXING DEVICE

Filed Feb. 26, 1938

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

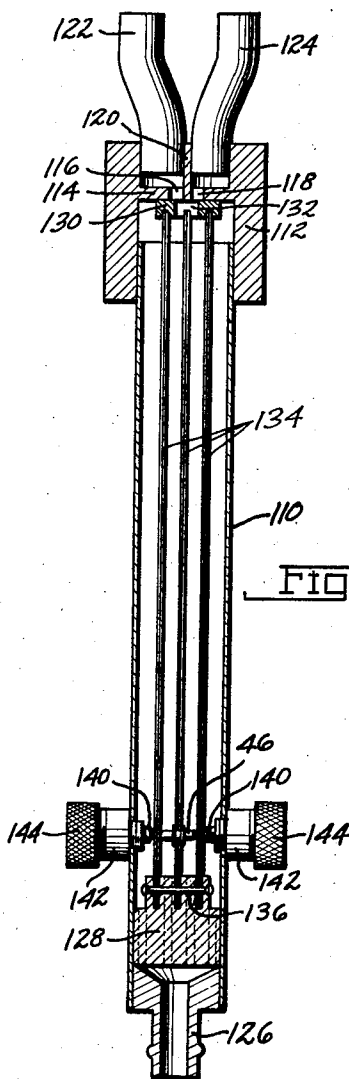


FIG. 3

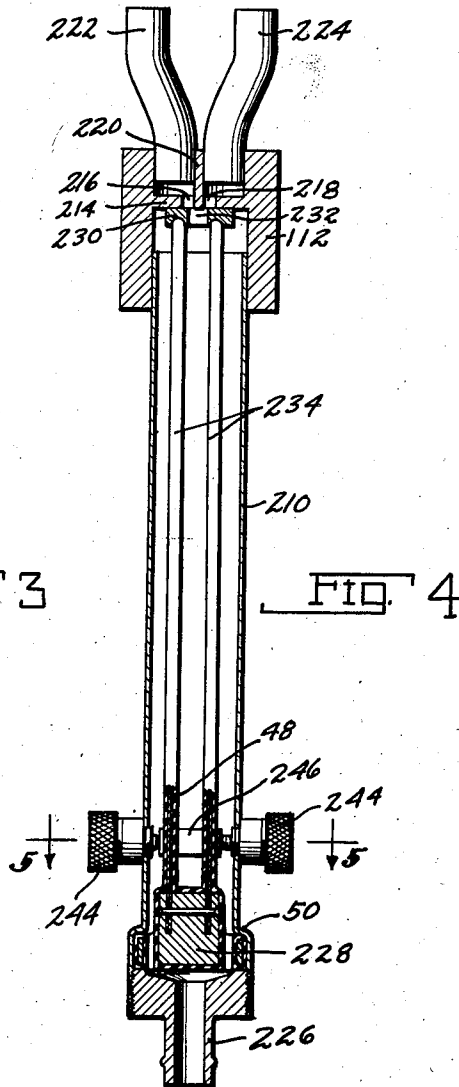


FIG. 4

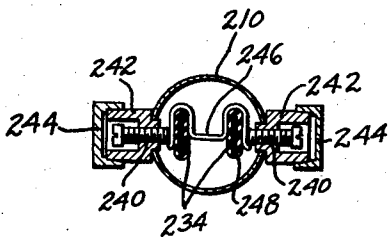


FIG. 5

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MIXING DEVICE

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Application February 26, 1938, Serial No. 192,692

4 Claims. (Cl. 236—12)

This invention relates to mixing devices and more particularly to devices for mixing hot and cold fluids such as water to provide a mixture having a substantially constant temperature.

One of the objects of the invention is to provide an extremely simple yet positive and reliable device for maintaining a function of a mixture of fluids constant.

Another object of the invention is to provide a mixing device for hot and cold fluids in which the relative proportions of the fluids are controlled by thermostatic means entirely housed within the mixing chamber. In one preferred form the thermostatic means is an elongated bi-metal strip extending substantially from the inlet to the outlet of the mixing chamber.

Another object of the invention is to provide a mixing device having a bimetal strip controlling admission of fluid to be mixed and including novel mounting means for the strip.

Another object is to provide a mixing device including a valve member controlled by a bi-metal strip in which the strip is so formed as not to interfere with mixing of the fluids. Preferably the strip is cut out adjacent the valve member to permit free intermingling of fluids admitted past the valve.

Other objects, advantages and novel features of the invention will be apparent from the following description when read in connection with the accompanying drawings in which:

Figure 1 is a center section through a mixing device embodying the invention;

Figure 2 is a center section at right angles to Figure 1 with parts in elevation.

Figure 3 is a center section of a modified mixing device employing a plurality of bimetallic strips;

Figure 4 is a center section of another modified mixing device employing bimetallic strips protected against corrosion by a covering of rubber or the like; and

Figure 5 is a section on the line 5—5 of Figure 4.

The mixing device illustrated in Figures 1 and 2 comprises an elongated tube 10 forming a mixing chamber having a plug 12 at its inlet end provided with a transverse plate 14 which is formed with a pair of openings 16 and 18 separated by web 20. The opening 16 communicates with a pipe 22 leading to a source of cold water or the like and the opening 18 communicates with a pipe 24 leading to a source of hot water or the like.

The opposite end of the tube 10 carries an out-

let nipple 26 and a perforated plug 28 adjacent to the outlet nipple.

In order to control the relative amounts of hot and cold fluid admitted to the mixing chamber, a disk 30 provided with a center aperture 32 is slidably mounted against the inner face of the plate 14 with the aperture in register with the openings 16 and 18. The disk is connected to one end of a bi-metal thermostatic strip 34, the opposite end of which is fixed to the plug 28 as by means of a rivet 36. As best seen in Figure 2, the strip 34 is secured to the disk 30 on opposite sides of the aperture 32 and has a cut-out portion 38 in register with the aperture to permit ready mingling of fluid on opposite sides of the strip. It will also be noted that the strip 34 serves as a strut to support the disk 30 against the plate 14.

The setting of the strip 34 is controlled by a pair of screws 40 threaded through caps 42 which extend through the tube 10 on opposite sides of the strip. If desired, covers 44 may be secured to the ends of the caps 42 to cover the ends of the screws 40.

In operation the screws 40 are adjusted to tension the strip 34 to produce any desired mixture temperature. If the temperature of mixed fluid in the mixing chamber 10 becomes too high, the strip will deflect in a direction to restrict the opening 18 and to open further the opening 16. This will admit an increased amount of cold water and a smaller amount of hot water to bring the temperature back to the desired value.

In the mixing device illustrated in Figure 3, parts corresponding to parts shown in Figures 1 and 2 are designated by the same reference numerals increased by 100 and such parts will not be particularly described hereafter.

This device is characterized by the use of a plurality of bimetallic thermostatic strips 134, e. g., three such strips, instead of a single one, whereby the valve disk 130 is better supported against the pressure of the water issuing from the openings 116 and 118 and whereby the power available to shift the disk 130 is augmented. The three strips are secured in face to face relationship in spaced parallel slots in the plug or support 128 by means of a rivet 136.

In the illustrated device, I prefer to provide on the center strip 134 spacing means in the form of a rivet 46 positioned in axial alignment with the adjusting screws 140 and projecting on each side of the center strip to engage the outer strips. By this means adjustment of the screws 140 is transmitted to all of the strips 134.

In the modification of Figures 4 and 5 corresponding parts are designated by the same reference numerals plus 200. This modification is characterized by the use of a coating of rubber or resin or similar corrosion resisting material 43 applied by dipping or spraying or the like to the surface of the strips 234 (two in number) and the plug 228 to form an unbroken sheath thereover. The strips are secured in slots in the plug 228 by a rivet 236 in the same manner as the strips of the preceding modifications and the plug 228 is held securely in place by being clamped between a shoulder 50 formed in the tube 210 and the outlet nipple 226 threaded into the end of the tube 210.

In order to simultaneously adjust both strips and reduce the possibility of abrasion of the coating 43, I provide a yoke 246 closely holding the two strips and engaged by the screws 240.

While three embodiments of the invention have been shown and described in detail, it will be understood that various changes might be made therein and that the illustrated devices might be employed to control mixture of substantially any desired fluids. It is accordingly not intended to limit the scope of the invention to the exact forms shown nor otherwise than by the terms of the appended claims.

What is claimed is:

1. A mixing device comprising an elongated tubular mixing chamber, a plate at one end of the mixing chamber formed with a pair of spaced openings communicating with sources of hot and cold water respectively, a perforated plug in the other end of the mixing chamber, a bimetal strip secured at one end to said plug and extending through the mixing chamber substantially to said plate, and an apertured disc connected to the other end of said strip and slidable across said plate, said strip having a cut out portion therein opposite the aperture in the disc.

2. A mixing device comprising an elongated tubular mixing chamber, a plate at one end of

the mixing chamber formed with a pair of spaced openings communicating with sources of hot and cold water respectively, a perforated plug in the other end of the mixing chamber, a bimetal strip secured at one end to said plug and extending through the mixing chamber substantially to said plate, and an apertured disc connected to the other end of said strip and slidable across said plate, said strip serving as a strut to support the disk against the plate.

3. A mixing device comprising an elongated tubular mixing chamber, a plate at one end of the mixing chamber formed with a pair of spaced openings communicating with sources of hot and cold water respectively, a perforated plug in the other end of the mixing chamber, a bimetal strip secured at one end to said plug and extending through the mixing chamber substantially to said plate, and an apertured disc connected to the other end of said strip and slidable across said plate, said strip having a cut-out portion therein opposite the aperture in the disc, said mixing chamber having adjustably mounted in its opposite side walls members engaging opposite sides of said strip near said plug, and said strip serving as a strut to support the disk against the plate.

4. A mixing device comprising a mixing chamber, a plate forming one wall of the mixing chamber and having therein a pair of spaced openings communicating with sources of hot and cold liquid respectively, an apertured disk slidable over said plate, a support in the mixing chamber, and a plurality of spaced bimetal strips secured at one end to the support and at the other end to the disk to move the disk in response to variations in the temperature of fluid in the mixing chamber, said bimetal strips being arranged in parallel face to face relationship and acting as spaced struts to support the disk against the plate.

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